

Polarity conversion of top-gated SWNT network transistor by Post-Annealing

김진용¹, 민신철¹, 김언정², 박완준¹

¹한양대학교 전자통신컴퓨터공학부, ²Frontier Research Lab. 삼성종합기술원

Top-gated single walled carbon nanotube(SWNT) network transistors were fabricated with Al_2O_3 layer as a gate dielectric processed by ALD technique at 350°C . It exhibits n-type I-V characteristics with on/off ratio($>10^4$) and mobility($\sim 10\text{cm}^2/\text{V}\cdot\text{s}$).

To study the heat treatment effect on the device, we carried out the post-annealing at 350°C for 30min under vacuum. It was to allow to observe the dramatic conversion of the polarity in the I-V characteristics of the top-gated SWNT transistor. The polarity was changed from n-type to p-type after the post-annealing without decreasing the on/off ratio. This post annealing effect on nanotube transistor may provide a simple way to realize CNT-based CMOS technology without complicated doping process.